SOLVING GENERAL TASKS RELATED TO PHYSICS AND ECOLOGY

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Abstract. *In this article, by problem solving the issues related to physics and ecology, the issues of making young people indifferent to nature, environment and themselves are covered in detail. It has been shown that solving problems related to physics and ecology creates a sense of responsibility in people.*

Keywords: *gas, tree, forest, water, water surface, oxygen, physics lesson, clean soil.*

The rapid development of science, technology and technology raises the protection of natural resources and the coordination of their use to the level of an urgent issue of the day. Physics is inextricably linked with all natural sciences and ecology. Understanding its laws, man discovered new phenomena in nature, a new world. He began to use various resources in the depths of the earth, thanks to physics, mankind went into space, discovered other planets around him. Today, it is difficult to single out a field where physics has not penetrated. It is no secret today that it is because of this science that mankind lives well. He can use his planet almost completely, but he also needs to know his responsibilities.

Friction allows it to walk, drive, fly in airplanes, and even sit and sleep. He can use his planet almost completely, but he also needs to know his responsibilities. He can use his planet almost completely, but he also needs to know his responsibilities. We must not forget that filling the full tank of our car with fuel, throwing another half-filled sheet into the trash can, creating self-dumps in the forest, around the city, we are causing great harm to our planet. According to scientists, it takes about 100 years for one plastic bottle to decompose! Considering how many of these bottles are produced per second and how many of them end up around the world without being disposed of, you can imagine what would happen if they all end up on the ground, seas and oceans.

If the release of smoke, carbon dioxide and other harmful substances into the atmosphere is not reduced, the composition of the air may inevitably not change for the better. Taking into account the above, it is necessary to instill in a person love for his home - planet Earth, and to explain that its possibilities are endless. People realized that the world they live in needs help and started to act. They began to build treatment plants that turned wastewater into clean water suitable for drinking and domestic use. Waste processing plants and ecological fuels appeared.

It is also important to instill universal human values in the children of today's generation, and the sooner this work is started, the more noticeable the result will be. Environmental education in physics lessons helps children to understand how important it is to keep our planet clean. They will learn better about all types of environmental pollution and how to deal with them. Thus, nature remains in safe hands and enjoys its beauty for more than a thousand years. What techniques and methods can be used in physics lessons to attract children's attention to participation in solving environmental problems, taking into account the limited time of the lesson? This is, first of all, participation in environmental activities held at school.

It may include publishing wall newspapers, participating in quizzes, contests, etc. During the lesson, you can solve 1-2 tasks on the ecological theme, taking into account the topic being studied or by repeating it. For example, it is possible to solve problems in the branch dedicated to the preservation of trees, i.e. forests:

1. Forests are the lungs of our planet. One hectare of forest removes 18 million cubic meters of carbon dioxide from the air per year. How many cubic meters of air will remove carbon dioxide from a 15-hectare forest in a year?

Answer. 270 000 000 m^3

2. Picture task. One discarded battery pollutes 20 m^2 of ground surface with heavy metals - the area of two mature trees or kills one hedgehog. How many square meters of clean land and trees did the students of our school save by collecting 902 batteries? How many lives did he save? Answer. 18040 m^2 of clean land, 1804 trees and 902 hedgehogs were saved.

3. Why do we feel the smell of grass and flowers, even though it is quiet in the forest and there is not even a breath of breeze? Answer. Diffusion occurs; Molecules of aromatic substances move in the air.

4. A glass bottle lying in the forest caused a fire. If up to 9 trees burn in 10 minutes, how many trees will be destroyed by fire in 2 hours. (Remember, a bottle left in the forest can cause a fire.) Answer. 108 trees.

5. One hectare of middle-aged forest absorbs 4.6-6.5 tons of carbon dioxide and emits 3.5-5 tons of oxygen per year. How many tons of oxygen does 50 hectares of forest produce? Answer. About 250 tons.

6. Sixty kilograms of waste paper saves one tree. How many trees will be saved by 4 tons of waste paper collected by students of physics and astronomy teaching methods? Answer. About 66 trees.

The following issues related to water issues can be resolved:

1. Why does oil spread over a thin layer of water surface? How does an oil film affect the biosphere of a water body? Answer: The density of oil is less than the density of water, so oil floats on the surface of water. The oil layer prevents the diffusion of oxygen into the water body and the diffusion of carbon dioxide into the atmosphere. The oil film reduces the illumination of the water body, hinders the process of photosynthesis, and destroys the thermal insulation of waterfowl feathers.

2. It is known that one battery pollutes up to 400 liters of water with heavy metals. Students of our faculty collected 902 batteries. How many cubic meters of fresh water did the students save? Answer. 360,8 m^3.

3. Why should there be many trees on the banks of the river in order for it to flow fully? Answer: Tree roots collect and store underground moisture reserves that supply the river due to the principle of capillarity. In order to save water, it is necessary to preserve and maintain forests.

4. There are two interconnected seas in Russia, the Sea of Azov and the Black Sea, the first is almost fresh, the second is salt water. Can water flowing from one sea to another through the Kerch Strait have a harmful effect on marine life? Answer. The Sea of Azov is filled with fresh water by the Don and Kuban rivers, but if its level rises, its overflow does not pose a danger to the inhabitants of the Black Sea. In the years of drought, the water level in the Sea of Azov decreases, salt water from the Black Sea is partially deposited in the Sea of Azov and kills fish living in fresh water.

5. About 1000 liters of water are poured from an open tap per hour. How many cubic meters of water are poured during the day? Answer. 24 m^3

6. Lake Waikatipu, the longest in New Zealand, stretches almost a hundred kilometers from northwest to southeast. A mysterious phenomenon is connected with this lake, the explanation of which has not yet been found by science. The water in it rises by seven and a half centimeters every five minutes, then falls to the previous level. The lake seems to be breathing. Determine the amplitude and frequency of the "lake breath".

Answer. Amplitude - 3.75 cm, frequency - 0,5 min^{-1}.

We know that the role of birds is important for the constant balance of the relationship in nature, and it is possible to solve the following issues dedicated to them:

1. Sometimes birds have to fly non-stop over seas and mountains. The longest "non-stop" flight of 3,300 km is made by curlews and plovers, who fly from the North American continent to the Hawaiian Islands to spend the winter. The average speed of migratory birds is 50 km per hour. Determine the time of non-stop flights of birds. Answer. About 66 hours.

2. Swallows and swifts are the fastest winged birds. Their flight speed is 100-150 km per hour. But mallard ducks are lower than them, they fly at a speed of 96 km per hour. How far do these birds fly in 1 minute? Answer. Swift birds (strige) have a maximum speed of 2500 m, and that of mallards is about 1600 m.

3. French researchers determined how far the albatross flew and how fast it flew using a radio beacon. It turned out that the bird traveled 15,200 km in 33 days. Determine the average speed of the albatross. Answer. About 5.3 m/s.

4. A pigeon weighing 3N rises to a height of 100 m in 20 seconds. What power does it get? Answer. 15 W

The following issues related to the preservation of the ozone layer can be solved:

1. Why are factory pipes made as high as possible? Answer: The higher the pipe is built above the furnace, the greater the pressure difference between the outside air and the air in the furnace and pipe, so the draft increases as the pipe grows. A good draft is important to obtain high temperatures and complete combustion of the fuel.

2. Industrial centers located in the humid climate zone pollute the atmosphere very strongly. Why? Answer: Dust particles of industrial waste, smoke particles with high humidity serve as water vapor condensation centers. As a result, the mass of such particles increases and their propagation speed decreases. Therefore, dust particles form smoke clouds around the industrial center.

3. Atmospheric pollution with industrial waste leads to the reduction of glaciers in the mountains. Why? What are the possible consequences of this? Answer: Industrial waste settles on the surface of glaciers in the form of dust, which accelerates their melting under the influence of sunlight. Depletion of ice can lead to climate change.

4. If a car consumes 30 liters of gasoline, how much exhaust gas does it emit into the air per day? Answer. 24 kg.

Thus, by solving problems directly related to physics topics in the classroom, it is possible to introduce environmental tones into the conditions of these problems, which in many ways is able to focus the attention of students on environmental problems. Humans should treat natural resources rationally and carefully, they understand that they are not unlimited and their careless use can lead to very, very sad consequences. An ecologically literate young generation can feel its

responsibility for the relationship between man and nature, realistically assess the causes of the unfavorable ecological situation and take the necessary measures to correct ecological mistakes and save our planet for many years from destruction and carries out the necessary work that creates the ground for the occurrence of man-made cataclysms.

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